APPEAL BRIEF UNDER 37 C.F.R. § 41.37

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Rohit Ramani et al.	Examiner: Christine Y. Ng
Serial No.: 10/017,642	Group Art Unit: 2616
Filed: December 14, 2001	Docket: 1488.011US1

For: TECHNIQUE TO IMPROVE THE PERFORMANCE OF TRANSMISSION CONTROL PROTOCOL- TCP IN LOSSY NETWORKS

APPEAL BRIEF UNDER 37 CFR § 41.37

Mail Stop Appeal Brief- Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The Appeal Brief is presented in support of the Notice of Appeal to the Board of Patent Appeals and Interferences, filed herewith, from the rejection of claims 1-3, 8-10, 12-14, 19-21, 26-29 and 33-36 of the above-identified application, as set forth in the Office Action mailed on June 12, 2006. The Office Action of June 12, 2007 reopened prosecution in this case in response to an Appeal Brief that was filed on January 29, 2007.

The Appellant respectfully submits that the previously paid appeal fee per U.S.P.T.O. rules covers any fees associated with this present Appeal Brief. However, if any further fees are required, the Commissioner of Patents and Trademarks is hereby authorized to charge Deposit Account No. 19-0743 for such fees. The Appellants respectfully request consideration and reversal of the Examiner's rejections of pending claims.

1. REAL PARTY IN INTEREST

The real party in interest of the above-captioned patent application is the assignee, SASKEN COMMUNICATION TECHNOLOGIES LIMITED.

2. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to Appellant that will have a bearing on the Board's decision in the present appeal.

3. STATUS OF THE CLAIMS

The present application was filed on December 14, 2001 with claims 1-36. A non-final Office Action was mailed February 9, 2006. A Final Office Action was mailed July 24, 2006. An Appeal Brief was filed on January 29, 2007, and an Office Action of June 12, 2007 reopened prosecution. Claims 4-7, 11, 15-18, 22-25 and 30-32 are objected to. Claims 1-3, 8-10, 12-14, 19-21, 26-29 and 33-36 stand twice-rejected, remain pending, and are the subject matter of the present appeal.

4. STATUS OF AMENDMENTS

No amendments have been made subsequent to the Final Office Action, dated July 24, 2006 and the Office Action dated June 12, 2007.

5. SUMMARY OF CLAIMED SUBJECT MATTER

Some aspects of the present inventive subject matter include, but are not limited to, in one embodiment, as recited in independent claim 1, a method for providing a transport protocol within a lossy network. The method includes receiving multiple packets. (Page 7, lines 7-8; FIG. 3, No. 115; FIG. 5, No. 510). Each of the received packets includes a header and an associated sequence number, and the header includes a congestion alleviation indication and an impending congestion indication. (Page 7, lines 8-17). The network is monitored for congestion caused by the received packets. The header of some of the packets are marked with an impending congestion indication based on the outcome of the monitoring of the network. (Page 7, line 18 – Page 8, line 3; FIG. 3, No. 320; FIG. 5, Nos. 520, 530). The monitored multiple packets are transmitted through the lossy network. (Page 7, line 18 – Page 8, line 3; FIG. 3, No. 320; FIG. 5, Nos. 520, 530). Acknowledgements of receipt are returned for each of the transmitted packets, based on the sequence number associated with each of the packets, and any associated marked impending congestion indication and the congestion alleviation indication. (Page 7, line 18 – Page 8, line 3; FIG. 3, No. 320; FIG. 5, Nos. 520, 530). Each of the received acknowledgements are monitored for the sequence number and the marked impending congestion indication associated with each of the received packets. (Page 9, lines 3-4; FIG. 3, No. 110; FIG. 5, No. 560). A congestion control mechanism is invoked to control a congestion window size which regulates the transmitted packets based on the monitoring of the acknowledgements and the marked impending congestion indication, and the header is marked with a congestion alleviation indication. (Page 9, lines 4 – 21; FIG. 3, No. 110; FIG. 5, No. 570).

In another embodiment, as recited in independent claim 12, a computer-readable medium (FIG. 6, No. 604) is disclosed that has computer-executable instructions (FIG. 510, Nos. 510-570) for providing a transport protocol within a lossy network. The instructions allow for receiving multiple packets. (Page 7, lines 7-8; FIG. 3, No. 115; FIG. 5, No. 510). Each of the received packets includes a header and an associated sequence number, and the header includes a congestion alleviation indication and an impending congestion indication. (Page 7, lines 8-17). The instructions further allow for monitoring the network for congestion caused by the received packets. The instructions also mark the header of some of the packets with an impending

congestion indication based on the outcome of the monitoring, and transmit the monitored multiple packets through the lossy network. (Page 7, line 18 – Page 8, line 3; FIG. 3, No. 320; FIG. 5, Nos. 520, 530; Page 7, line 18 – Page 8, line 3; FIG. 3, No. 320; FIG. 5, Nos. 520, 530). The instructions return acknowledgements of receipt for each of the transmitted packets, based on the sequence number associated with each of the packets, and any associated marked impending congestion indication and the congestion alleviation indication. (Page 7, line 18 – Page 8, line 3; FIG. 3, No. 320; FIG. 5, Nos. 520, 530). The instructions further monitor each of the received acknowledgements for the sequence number and the marked impending congestion indication associated with each of the received packets. (Page 9, lines 3-4; FIG. 3, No. 110; FIG. 5, No. 560). The instructions also allow for invoking a congestion control mechanism to control a congestion window size which regulates the transmitted packets based on the monitoring of the acknowledgements and the marked impending congestion indication, and further for marking the header with a congestion alleviation indication. (Page 9, lines 4 – 21; FIG. 3, No. 110; FIG. 5, No. 570).

In another embodiment, as recited in independent claim 19, a computer system provides a transport protocol within a lossy network. (FIGS. 1, 2, and 3). The computer system includes a storage device, an output device, and a processor. (FIG. 5, Nos. 602, 604, 612, 614, and 618). The processor is programmed to repeatedly perform a method. The processor programmed method includes receiving multiple packets. (Page 7, lines 7-8; FIG. 3, No. 115; FIG. 5, No. 510). Each of the received packets includes a header and an associated sequence number, and the header includes a congestion alleviation indication and an impending congestion indication. (Page 7, lines 8-17). The method monitors the network for congestion caused by the received packets, and marks the header of some of the packets with an impending congestion indication based on the outcome of the monitoring. The method further transmits the monitored multiple packets through the lossy network (Page 7, line 18 – Page 8, line 3; FIG. 3, No. 320; FIG. 5, Nos. 520, 530; Page 7, line 18 – Page 8, line 3; FIG. 3, No. 320; FIG. 5, Nos. 520, 530), and returns acknowledgements of receipt for each of the transmitted packets, based on the sequence number associated with each of the packets, and any associated marked impending congestion indication and the congestion alleviation indication. (Page 7, line 18 – Page 8, line 3; FIG. 3, No. 320; FIG. 5, Nos. 520, 530). Lastly, the method monitors each of the received acknowledgements for the

sequence number and the marked impending congestion indication associated with each of the received packets (Page 9, lines 3-4; FIG. 3, No. 110; FIG. 5, No. 560), and invokes a congestion control mechanism to control a congestion window size which regulates the transmitted packets based on the monitoring of the acknowledgements and the marked impending congestion indication, and marks the header further with congestion alleviation indication. (Page 9, lines 4 – 21; FIG. 3, No. 110; FIG. 5, No. 570).

In another embodiment, as recited in independent claim 26, an apparatus provides a transport protocol within a lossy network. (FIGS. 1, 2, and 3). The apparatus includes a sender base station. (FIG. 3, No. 115). The sender base station receives multiple packets from a sender and outputs the packets through a lossy network. (Page 7, lines 7-8; FIG. 3, No. 115; FIG. 5, No. 510). Each of the received packets includes a header and an associated sequence number, and the header includes a congestion alleviation indication and an impending congestion indication. (Page 7, lines 8-17). A communication network includes an analyzer to receive the outputted packets, to monitor the network for congestion caused by the received packets, and to further mark the header of some of the received packets with an impending congestion indication based on an outcome of the monitoring. (FIG. 3, No. 320). A receiver base station includes a transmit module to transmit the packets through the lossy network. (Page 7, line 18 – Page 8, line 3; FIG. 3, No. 320; FIG. 5, Nos. 520, 530; Page 7, line 18 – Page 8, line 3; FIG. 3, No. 320; FIG. 5, Nos. 520, 530). A receiver receives the transmitted packets and sends acknowledgements back to the sender through the communication network. (Page 7, line 18 – Page 8, line 3; FIG. 3, Nos. 140, 320; FIG. 5, Nos. 520, 530). The acknowledgements include a sequence number associated with each of the received packets, any associated marked impending congestion indication, and the congestion alleviation indication. The sender monitors each of the received acknowledgements for the sequence number and the marked impending congestion indication associated with each of the received packets. (Page 9, lines 3-4; FIG. 3, No. 110; FIG. 5, No. 560). The sender further invokes a congestion control mechanism to control a congestion window size which regulates the transmitted packets based on the monitoring of the acknowledgements and the marked impending congestion indication, and further marks the header with congestion alleviation indication. (Page 9, lines 4 – 21; FIG. 3, No. 110; FIG. 5, No. 570).

This summary does not provide an exhaustive or exclusive view of the present subject matter, and Appellant refers to the appended claims and their legal equivalents for a complete statement of the invention.

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-3, 9-10, 12-14, 19-21, 26-29, and 34-36 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Chapman, et al. (U.S. Patent No. 6,922,390) in view of Takagi (U.S. Patent No. 6,937,600).

Claims 8 and 33 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Chapman et al. (U.S. Patent No. 6,922,390) in view of Takagi (U.S. Patent No. 6,937,600) and in further view of LaGalbo et al. (U.S. Patent No. 6,947,446).

7. ARGUMENT

A. Introduction

As stated above in Section No. 6, the pending claims were rejected under 35 U.S.C. § 103(a) as being unpatentable over a combination of Chapman, et al. (U.S. Patent No. 6,922,390), LaGalbo et al. (U.S. Patent No. 6,947,446), and Takagi (U.S. Patent No. 6,937,600). The Appellant respectfully seeks reversal of this rejection.

A patent may not be obtained for an invention, even though the invention is not identically disclosed or described in a single patent or other publication, if the differences between the subject matter of the invention and the prior art are such that the subject matter as a whole would have been obvious at the time that the invention was made to a person having ordinary skill in the art to which the subject matter of the invention pertains.[1] An obviousness analysis under § 103 is objective. That is, the scope and content of the prior art are determined, the differences between the prior art and the claims at issue are ascertained, and the level of ordinary skill in the pertinent art is resolved. It is against this background that the obviousness or nonobviousness of the subject matter is determined. Other considerations such as commercial success, long felt but unsolved need, and the failure of others might be utilized to shed light on the circumstances surrounding the origin of the subject matter sought to be patented.[2] While the obviousness analysis need not seek out precise teachings directed to the specific subject matter of a claim, the analysis should nevertheless be explicit, including some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness, and not based on mere conclusory statements.[3] An indication of a teaching, suggestion, or motivation in the prior art may be part of this analysis, since there is no necessary inconsistency between the idea underlying the teaching, suggestion, and motivation test and the *Graham* analysis. However, the general principle of the teaching, suggestion, and motivation test should not be transformed into a rigid rule that limits the obviousness inquiry.[4] Rather, the approach to the determination of

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[1] 35 U.S.C. § 103(a).
[2] *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, p. 2 slip opinion (2007), *citing Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 15-17 (1966).
[3] *Id.*, p.14, *citing In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006).
[4] *Id.*, p. 15.

obviousness or nonobviousness should remain expansive and flexible.[5] And further while there is a need for caution in granting a patent based on a combination of elements found in the prior art,[6] a patent composed of several elements is not proved obvious merely by showing that each of its elements was, independently, known in the prior art. Therefore, it can be important to identify a reason that would have prompted a person of ordinary skill in the art in the relevant field to combine the elements in the way the claimed new invention does.[7]

B. The Cited Art And The Claimed Subject Matter

U.S. Patent No. 6,922,390 to Chapman et al. ("the '390 patent") relates to a method and apparatus for forecasting and controlling congestion within a data transport network. (Col. 1, lines 9-12). The Office Action of February 9, 2006 admits that the '390 patent does not disclose a header that includes a congestion alleviation indication. The Office Action of February 9, 2006 further admits that the '390 patent does not mark the header with a congestion alleviation indication after invoking a congestion control mechanism. The Office Actions of July 24, 2006 and June 12, 2007 repeat these admissions.

U.S. Patent No. 6,937,600 to Takagi relates to a communication device and method using a lower layer and an upper layer. Takagi indicates that congestion control can be carried out by reducing the amount of data that can be transmitted to a network by reducing a window size. (Col. 13, lines 39-41). As part of a TCP/IP specification, a bit in the TOS (Type of Service) field is set as a CE (Congestion Experienced) bit. Also, in a Reserved field, a bit is set as a CWR (Congestion Window Reduced) bit and another bit is set as an ECN-Echo bit (Explicit Congestion Notification). (Col. 13, line 66 – Col 14, line 7). When the CE bit is set to 1, the ECN-Echo bit is set to 1 until a packet with the CWR bit set to 1 is received. At this point, the window size is reduced by carrying out congestion control. (Col. 14, lines 27-35).

Claim 1 of the pending application recites a method for a transport protocol within a network. The packets transmitted through the network include a header, and the header includes a congestion alleviation indication. After invoking a congestion control mechanism, the header

[5] *Id.*, p. 11.
[6] *Id.*, p.11.
[7] *Id.*, pp. 14-15.

is marked with a congestion alleviation indication. All of the other independent claims (*i.e.*, claims 12, 19, and 26) recite these same limitations.

With all due respect to the Patent Office and the Examiner, the cited art in general, and Takagi in particular, simply does not disclose a congestion alleviation indication. Consequently, since the scope and content of the cited references do not disclose either a congestion alleviation indication, or marking a header with a congestion alleviation indication, the Patent Office has failed to establish a *prima facie* case of obviousness, and the Appellant respectfully seeks reversal of the rejection of the claims.

C. The PTO Has Failed To Establish A *Prima Facie* Case Of Obviousness

The Patent Office has failed to established a *prima facie* case of obviousness under 35 U.S.C. § 103(a) at least because neither the '390 patent to Chapman et al. nor the '600 patent to Takagi discloses a header record containing a congestion alleviation indication, or marking a header with a congestion alleviation indication after invoking a congestion control mechanism.

Contrary to the assertions in the Office Action of June 6, 2007, the CWR bit does not read on the "congestion alleviation indication" of the claims. As the name itself implies, the CWR bit, or the Congestion Window Reduced bit, only indicates that congestion control is attempted by reducing the window size. (Col. 13, lines 39-41; Col. 14, lines 33-35). The CWR bit does not indicate whether or not congestion was actually controlled, and it certainly does not indicate whether the congestion was alleviated. Indeed, the CWR bit of Takagi suffers from the same shortcomings as the EFCI bit of Lee (which was relied upon in the Advisory Action of October 18, 2006, but has since been abandoned by the Patent Office). Specifically, one can never be certain with the ECFI bit of Lee or the CWR bit of Takagi whether or not congestion has been alleviated. However, by contrast, the congestion alleviation bit of the presently claimed invention leaves no doubt that congestion has been alleviated.

As mentioned in the previous paragraph, the name of the CWR bit, somewhat tellingly, only suggests that the bit may be used to indicate window reduction. The bit name does not disclose, suggest, teach, or hint that it may indicate congestion alleviation. More tellingly, the portion of Takagi cited by the Office Action makes no disclosure, suggestion, teaching, or hint of a method, system, or structure to indicate that congestion has been alleviated. Takagi relates

only to the attempted control of congestion, [8] and offers no teaching of an indication that informs of the alleviation of congestion. Rather, that teaching is supplied by the Office Action, using the teachings of the Applicant's disclosure against the Applicant.

The Patent Office, in its Advisory Action of October 18, 2006, tacitly admits that there is a distinct difference between congestion control and congestion alleviation. Specifically, the Advisory Action stated that when the EFCI bit of Lee is set, the system will lower its cell rate to control congestion, and once the congestion is alleviated, the EFCI bit is set back to "0". Therefore, at least according to the Patent Office, congestion is first controlled before it can be alleviated. The Appellant respectfully submits that, in addition to the fact that congestion control occurs in time before congestion alleviation, this contol may or may not be successful, and therefore congestion may or may not actually be alleviated.

The CWR bit of Takagi is nothing more than a technique for the well known algorithm of adjusting windows based on received packets with congestion indications. As pointed out in the Appellant's response of May 9, 2006, this well known concept is disclosed in Chapman at Col. 6, lines 12-39. The Patent Office has therefore been put on notice that Chapman discloses a well known algorithm of adjusting windows based on received packets with congestion indications. Notwithstanding this, the Patent Office continues to admit that Chapman fails to disclose a header with a congestion alleviation indication, or marking the header with a congestion alleviation indication. This is not all that surprising, because a technique of adjusting windows is simply not a congestion alleviation indication. However, what is surprising is that the Patent Office speaks out of the other side of its mouth and argues that the Congestion Window Reduced (CWR) bit of Takagi is a congestion alleviation indication. It is simply irreconcilable to admit that Chapman, with its disclosure of adjusting windows based on congestion indications, does not disclose a header with congestion alleviation indications or marking a header with congestion alleviation indications, and then to argue that Takagi, with its CWR (congestion window reduced) indication, that indicates only an attempt at congestion control, discloses a congestion alleviation indication.

[8] The Office Action itself admits as such, for it states that both the CE bit and the CWR are used for congestion control. (Office Action, p. 4).

The Office Action contends on page 5 that when the CWR bit is set to "1", that indicates that congestion is being controlled and alleviated by reducing the window size. Once again, there is no disclosure in Takagi that informs when congestion has been alleviated. Rather, that is supplied only by the statement in the Office Action that a CWR bit set to "1" indicates that congestion is being controlled and "alleviated." It is improper for the Patent Office to reject a claim that includes an element that is not found in the prior art, but is found only in an applicant's disclosure.

Furthermore, the unsupported conclusion in the Office Action that the CWR bit indicates that congestion is being alleviated clouds the fact that the CWR bit provides information only on whether the window size has been reduced. By stark contrast, the congestion alleviation indication of the present claims indicates whether congestion has been alleviated or not. The reduction of a window size and the alleviation of congestion are two distinct pieces of information (as further indicated by the presence of the limitation of "invoking a congestion control mechanism to control a congestion window size" and "further marking the header with a congestion alleviation indication" in every independent claim of the present application). A congestion alleviation indicator indicates congestion alleviation and does not indicate a reduction in window size, and a window size reduction indicator indicates a reduction in window size but does not indicate that congestion has been alleviated.

Consequently, a person of skill in the art, upon examining the CWR bit, can never tell, without further analysis or information, whether congestion has been alleviated. The Applicant's disclosure has filled this void in the prior art, for in the Applicant's disclosure, the congestion alleviation indication always, without more, indicates whether congestion has been alleviated or not. Takagi fails to teach or suggest this congestion alleviation, the logic of the Office Action amounts to invention based upon the Applicant's disclosure, and the Patent Office consequently fails to establish, per the *Graham* factors, a *prima facie* case of obviousness. The Applicant therefore respectfully requests the reversal of the rejection of the claims.

8. SUMMARY

It is respectfully submitted that the art cited does not render the claims obvious and that the claims are patentable over the cited art. Reversal of the rejection and allowance of the pending claims are respectfully requested.

Respectfully submitted,

ROHIT RAMANI et al.

By their Representatives,

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Date June 26, 2006 By

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being filed using the USPTO's electronic filing system EFS-Web, and is addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 26 day of June 2007.

John D. Smith-Hill
Name

Signature

CLAIMS APPENDIX

1. A method for providing a transport protocol within a lossy network, comprising:

receiving multiple packets, wherein each of the received packets includes a header and an associated sequence number, wherein the header includes a congestion alleviation indication and an impending congestion indication;

monitoring the network for congestion caused by the received packets;

marking the header of some of the packets with an impending congestion indication based on the outcome of the monitoring;

transmitting the monitored multiple packets through the lossy network;

returning acknowledgements of receipt for each of the transmitted packets, based on the sequence number associated with each of the packets, and any associated marked impending congestion indication and the congestion alleviation indication;

monitoring each of the received acknowledgements for the sequence number and the marked impending congestion indication associated with each of the received packets; and

invoking a congestion control mechanism to control a congestion window size which regulates the transmitted packets based on the monitoring of the acknowledgements and the marked impending congestion indication, and further marking the header with a congestion alleviation indication.

2. The method of claim 1, wherein monitoring the network for congestion, comprises:

monitoring the number of packets waiting in line to be transmitted; and

comparing the number of packets waiting in line to a predetermined minimum line size and a predetermined maximum line size.

3. The method of claim 2, wherein marking the header of some of the packets with an impending congestion indication, comprises:

if the number of packets waiting in line is greater than the predetermined minimum line size and less than the predetermined maximum line size, then marking the header of some of the

received packets based on a predetermined probability with an impending congestion indication; and

if the number of packets waiting in line is greater than the predetermined maximum line size, then the packets waiting in line beyond the predetermined maximum line size will be dropped.

8. The method of claim 1, further comprising:

providing a forward error correction to the header of each packet.

9. The method of claim 1, wherein marking the header of some of the multiple packets with an impending congestion indication, comprises:

flagging CE (Congestion Experienced) bits in the header of some of the multiple packets; and

flagging a CWR (Congestion Window Reduced) bit in the header of some of the multiple packets.

10. The method of claim 9, wherein returning acknowledgements comprise:

flagging an ECE (Explicit Congestion Notification Echo) bit in the acknowledgements.

12. A computer-readable medium having computer-executable instructions for providing a transport protocol within a lossy network, comprising:

receiving multiple packets, wherein each of the received packets includes a header and an associated sequence number, wherein the header includes a congestion alleviation indication and an impending congestion indication;

monitoring the network for congestion caused by the received packets;

marking the header of some of the packets with an impending congestion indication based on the outcome of the monitoring;

transmitting the monitored multiple packets through the lossy network;

returning acknowledgements of receipt for each of the transmitted packets, based on the sequence number associated with each of the packets, and any associated marked impending congestion indication and the congestion alleviation indication;

monitoring each of the received acknowledgements for the sequence number and the marked impending congestion indication associated with each of the received packets; and

invoking a congestion control mechanism to control a congestion window size which regulates the transmitted packets based on the monitoring of the acknowledgements and the marked impending congestion indication, and further marking the header with a congestion alleviation indication.

13. The computer-readable medium of claim 12, wherein monitoring the network for congestion, comprises:

monitoring the number of packets waiting in line to be transmitted; and

comparing the number of packets waiting in line to a predetermined minimum line size and a predetermined maximum line size.

14. The computer-readable medium of claim 13, wherein marking the header of some of the packets with an impending congestion indication, comprises:

if the number of packets waiting in line is greater than the predetermined minimum line size and less than the predetermined maximum line size, then marking the header of some of the received packets based on a predetermined probability with an impending congestion indication; and

if the number of packets waiting in line is greater than the predetermined maximum line size, then the packets waiting in line beyond the predetermined maximum line size will be dropped.

19. A computer system for providing a transport protocol within a lossy network, comprising:

a storage device;

an output device; and

a processor programmed to repeatedly perform a method, comprising:

receiving multiple packets, wherein each of the received packets includes a header and an associated sequence number, wherein the header includes a congestion alleviation indication and an impending congestion indication;

monitoring the network for congestion caused by the received packets;

marking the header of some of the packets with an impending congestion indication based on the outcome of the monitoring;

transmitting the monitored multiple packets through the lossy network;

returning acknowledgements of receipt for each of the transmitted packets, based on the sequence number associated with each of the packets, and any associated marked impending congestion indication and the congestion alleviation indication;

monitoring each of the received acknowledgements for the sequence number and the marked impending congestion indication associated with each of the received packets; and

invoking a congestion control mechanism to control a congestion window size which regulates the transmitted packets based on the monitoring of the acknowledgements and the marked impending congestion indication, and marking the header further with congestion alleviation indication.

20. The system of claim 19, wherein monitoring the network for congestion, comprises:

monitoring the number of packets waiting in line to be transmitted; and

comparing the number of packets waiting in line to a predetermined minimum line size and a predetermined maximum line size.

21. The system of claim 20, wherein marking the header of some of the packets with an impending congestion indication, comprises:

if the number of packets waiting in line is greater than the predetermined minimum line size and less than the predetermined maximum line size, then marking the header of some of the received packets based on a predetermined probability with an impending congestion indication; and

if the number of packets waiting in line is greater than the predetermined maximum line size, then the packets waiting in line beyond the predetermined maximum line size will be dropped.

26. An apparatus for providing a transport protocol within a lossy network, comprising:

a sender base station to receive multiple packets from a sender and output the packets through a lossy network, wherein each of the received packets includes a header and an associated sequence number, wherein the header includes a congestion alleviation indication and an impending congestion indication;

a communication network including an analyzer to receive the outputted packets and monitor the network for congestion caused by the received packets and to further mark the header of some of the received packets with an impending congestion indication based on an outcome of the monitoring;

a receiver base station including a transmit module to transmit the packets through the lossy network; and

a receiver to receive the transmitted packets and to further send acknowledgements back to the sender through the communication network, wherein the acknowledgements include a sequence number associated with each of the received packets and any associated marked impending congestion indication and the congestion alleviation indication, wherein the sender monitors each of the received acknowledgements for the sequence number and the marked impending congestion indication associated with each of the received packets, and invokes a congestion control mechanism to control a congestion window size which regulates the transmitted packets based on the monitoring of the acknowledgements and the marked impending congestion indication, and further marks the header with congestion alleviation indication.

27. The apparatus of claim 26, wherein the analyzer further monitors a number of packets waiting in a line transmitted by the sender base station.

28. The apparatus of claim 26, wherein the analyzer further comprises a comparator to compare the number of received packets waiting in line with a predetermined minimum line size and a predetermined maximum line size, wherein the analyzer marks the header of some of the received packets with the impending congestion indication, based on the outcome of the comparison.

29. The apparatus of claim 28, wherein the analyzer marks the header of some of the received packets when the number of packets waiting in line is greater than the predetermined minimum line size and less than the predetermined maximum line size based on a predetermined probability with an impending congestion indication; and

if the number of packets waiting in line is greater than the predetermined maximum line size, then the packets waiting in line beyond the predetermined maximum line size will be dropped.

33. The apparatus of claim 26, wherein the sender further provides a forward error correction to the header of each packet.

34. The apparatus of claim 26, wherein the analyzer marking the header comprises flagging CE bits in the header.

35. The apparatus of claim 26, wherein the sender marking the header comprises flagging a CWR bit in the header.

36. The apparatus of claim 26, wherein the receiver marking the acknowledgement comprises flagging an ECE bit in the acknowledgement.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.